

ABSTRACT OF THE DISCLOSURE

A cost-effective, long-term, permanent method for stabilizing chromium in a chromium-contaminated waste matrix characterized by high concentrations of alkaline material (such as lime) includes the steps of contacting a source of hexavalent chromium with a source of ferrous ions to produce ferric ions; oxidizing iron pyrite to produce ferrous sulfate and sulfuric acid; and contacting the alkaline chromium-contaminated particulate matter with the ferrous sulfate and the sulfuric acid for a time sufficient to convert ferrous sulfate into ferric sulfate and to reduce mobile hexavalent chromium to non-leachable trivalent chromium. The method is integrated in that ferrous sulfate produced by oxidizing iron pyrite serves as a source of ferrous ions in the first contacting step. Optionally, ferric ions can be generated in a side reactor and then used to produce ferrous ions. The ferrous ions can be used both to produce further ferric ions in the side reactor and to treat COPR waste.